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STUMP DIAMETER AFFECTS SPROUT DEVELOPMENT OF TROPICAL ASH

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Can stump sprouts of tropical ash *(Fraxinus uhdei* [Wenzig] Lingelsheim*)* help in the management of the species? On nearly 1,500 acres[1] of tropical ash on the island of Hawaii, stands are now reaching a size where thinning or harvesting is being considered by forest managers. They would like to know what effect stump sprouts will have on the development of harvested or thinned stands.

To find out, we examined sample trees from a tropical ash stand 5 years after it had been thinned. We found that 70 percent of the stumps produced at least one sprout of acceptable form and of average or better vigor. An acceptable sprout was one that potentially could produce at least a 12-foot butt log at maturity. We also found that larger parent trees produced larger, faster-growing sprouts than did smaller parent trees.

The results suggest that it will be possible to rely on stump sprouts to regenerate cutover tropical ash plantations. Because of prolific sprouting, all but the most vigorous, well-formed sprouts on each stump should be cut. To prevent sprouting in thinned stands, it may be necessary to treat the stumps.

ABSTRACT: Five years after thinning, stump sprouts were measured on a tropical ash stand on the Honaunau Forest Reserve, island of Hawaii. Larger parent trees produced larger, faster-growing sprouts than did smaller parent trees. Seventy percent of the stumps produced at least one sprout of acceptable form and of average or better vigor. Results of the study suggest that it will be possible to rely on stump sprouts to regenerate cutover tropical ash plantations.
RETRIEVAL TERMS: Fraxinus uhdei; Hawaii; regeneration; stump sprouts.
OXFORD: 176.1 *Fraxinus uhdei:*(969):181.51.

METHOD

In 1964, a 35-year-old tropical ash stand in the Honaunau Forest Reserve on the island of Hawaii was thinned, reducing basal area from about 230 to 120 square feet per acre. Five years later, we examined stumps from this cutting to determine the relationship between stump diameter and: (a) number of sprouts/stump; (b) number of vigorous sprouts/stump; (c) number of acceptable sprouts/stump; (d) number of vigorous acceptable sprouts/stump; (e) height of tallest sprout/stump; and (f) diameter of biggest sprout/stump.

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RESULTS

Sprouts per stump.–Every stump in the sample produced stump sprouts (confidence interval of 94 to 100 percent[2]), with an average of six and a range of 1 to 12 sprouts per stump. In relating stump diameter class to average number of sprouts, we found that the number of stump sprouts increased as stump diameter increased, up to about the 16-inch class, and then gradually decreased *(fig. 1)*. This trend was shown by multiple regression analysis to be statistically significant, but the multiple correlation coefficient was only 0.39.

Vigorous sprouts per stump.–An analysis of variance showed a significant relation between stump size and sprout vigor: the bigger stumps produced the more vigorous sprouts.

About 94 percent of the stumps produced stump sprouts of average or better vigor (confidence interval: 83 to 99 percent), with an average of five and a range of 0 to 11 per stump.

Acceptable sprouts per stump.–An analysis of variance showed no significant relationship between stump size and number of acceptable sprouts. About 77 percent of the stumps produced sprouts of acceptable or better form (confidence interval: 57 to 84 percent), with an average of two and a range of 0 to 7 per stump.

Vigorous acceptable sprouts per stump.–About 71 percent of the stumps produced sprouts of acceptable or better form and average or better vigor (confidence interval: 57 to 84 percent), with an average of two and a range of 0 to 6 per stump.

Sprout height/diameter related to stump diameter.–As we suspected, the sprouts from the larger diameter stumps were both taller and of larger diameter than those from smaller diameter stumps. A 4-inch diameter stump, for example, had an average sprout height of 11 feet; a 20-inch diameter stump had sprouts which averaged 28 feet tall. Stump diameter and tallest sprout per stump were highly correlated (r = .80). Stump diameter and largest diameter breast height sprout per stump were also highly correlated (r = .77).

Notes

[1]Nelson, Robert E., and Honda, Nobuo. *Plantation timber on the Island of Hawaii–1965.* U.S. Forest Serv. Resource Bull. PSW-3. Pacific SW. Forest & Range Exp. Sta., Berkeley, Calif. 52 p., illus. 1966.

[2]Statistical significance is at the 95 percent level.

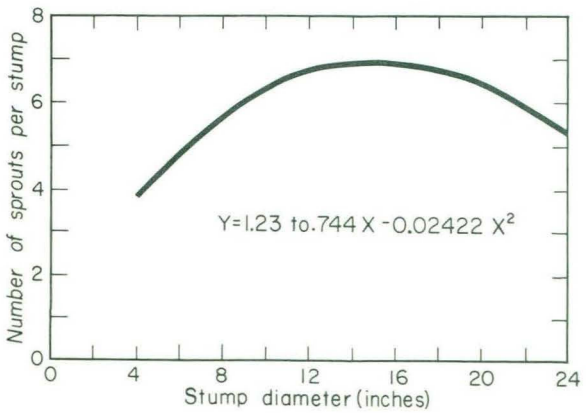

Figure 1.–*The number of tropical ash sprouts increased as stump diameter increased up to about the 16-inch class.*

Figure 2.–*Sprouts on tropical ash stump 4 months after cutting.*

Figure 3.–*Stump sprouts 5 years after thinning in a tropical ash stand. Some sprouts have become lodged.*

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